REMARKS

Claims 1-39, 41-66, and 68-77 are currently pending in the present application, with

Claims 1-25 and 43-56 being allowed, Claims 40, 67, and 78 being canceled, and

16, 26, 28, 30-34, 41, 57-58, 61, and 68-72 being amended. Reconsideration and

of the claims, as amended, are respectfully requested.

The Examiner rejected Claim 26 under 35 U.S.C. § 102(b) as being antici

et al. (U.S. Patent No. 4,128,032). This rejection is respectfully traversed with respect to the

amended claim.

The present invention is directed to a method of generating a tone waveform using a

processor. More specifically, Claims 26 is directed to a waveform synthesizing apparatus

including a processor, coupled to a storage having a waveform forming program, that can be

used to control the timing of writing and reading of waveform samples using the storage.

Wada discloses that a waveform data of one wave cycle can be generated, through

waveform synthesis, in accordance with a user's tone color selection operation and prestored into

memory. The stored waveform data are then successively read out from the memory in a

repeated manner to thereby generate a tone. However, Wada does not disclose or suggest

permitting data writing and reading in a parallel fashion, as recited in Claim 26. Furthermore,

Wada does not teach or suggest collectively generating multiple waveform samples by a

processor executing a waveform forming program, as also recited in Claim 26. Finally, Wada

does not disclose or suggest independently controlling the writing and reading of waveform

samples into and from a storage such that an advance of the writing does not outpace an advance

of the reading. Rather, Column 5, lines 17-32 of Wada simply discloses storing waveform

samples in multiple memory devices and reading them out synchronously. Accordingly,

Applicant respectfully submit that Claim 26 is not anticipated by, nor obvious in view of, Wada.

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The Examiner rejected Claims 26-28, 30-32, 41-42, 57-59, and 68-70 under 35 U.S.C. § 102(e) as being anticipated by Kuribayashi et al. (U.S. Patent No. 5,668,334). This rejection is respectfully traversed with respect to the amended claims.

Kuribayashi discloses a tone data reproduction and recording apparatus employing a hard disk device and personal computer. Kuribayashi does not disclose or suggest collectively generating multiple waveform samples by using a processor executing a program, as recited in Claims 26-28, 30-32, 41-42, 57-59, and 68-70. Furthermore, Kuribayashi does not teach or suggest independently controlling the writing and reading of waveform samples into and from a storage such that an advance of the writing does not outpace an advance of the reading, as particularly recited in Claims 26-28 and 41-42. Rather, Columns 8-9 of Kuribayashi, cited by the Examiner, simply teaches storing tone data into a hard disk using temporary buffer memory, whereby the tone data are written into the buffer in accordance with a sampling frequency generated by a sampling clock pulse. Accordingly, Applicant respectfully submit that Claims 26-28, 30-32, 41-42, 57-59, and 68-70 are not anticipated by, nor obvious in view of, Kuribayashi.

The Examiner rejected Claims 34-37, 39, 61-64, 66, and 72-75 under 35 U.S.C. § 102(e) as being anticipated by Kurata (U.S. Patent No. 5,677,504). This rejection is respectfully traversed.

The Examiner has indicated that Claims 40, 67, and 78, among others, are objected to being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. Applicant has incorporated the limitations of Claims 40, 67, and 78 into their respective independent claims, namely Claims 34, 61, and 72, and canceled Claims 40, 67, and 78. Accordingly, Applicant respectfully submit that amended Claims 34, 61, and 72, as well as claims dependent upon them (namely Claims 35-39, 61-65, and 72-76, respectively) are in condition for allowance.

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The Examiner rejected Claims 38, 65, and 76 under 35 U.S.C. § 102(a) as being unpatentable over Kurata. This rejection is respectfully traversed with respect to the amended claims.

As discussed above, Applicant has amended Claims 34, 61, and 72 to incorporate the limitations of allowable dependent Claaims 40, 67, and 78, respectively. Since Claims 38, 65, and 76 are dependent upon amended Claims 34, 61, and 72, Applicant respectfully submit that dependent Claims 38, 65, and 76 are also in condition for allowance.

Enclosed with this communication is an IDS listing prior art references cited by the Japanese Patent Office during the prosecution of the corresponding application in Japan. The references are submitted for the Examiner's consideration.

Allowed Claims 5, 12, 16 have been amended in order to more clearly distinguish the claimed invention from the prior art.

In view of the foregoing, Applicant respectfully submit that all of the pending claims in the present reissue application are in condition for allowance. Reexamination and reconsideration of the claims, as amended, are respectfully requested, and an early allowance is solicited. If the Examiner feels that it would advance the prosecution of the application, it is respectfully requested that he telephone the undersign attorney.

For the convenience of the Examiner, attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 393032015900.

Respectfully submitted,

Dated: September 6, 2001   By: _____
                                         David T. Yang
                                         Registration No. 44,415

                                         Morrison & Foerster LLP
                                         555 West Fifth Street
                                         Suite 3500
                                         Los Angeles, California 90013-1024
                                         Telephone: (213) 892-5587
                                         Facsimile: (213) 892-5454

In the Claims:

Claims 5, 12, 16, 26, 28, 30-34, 41, 57-58, 61, and 68-71 were amended in the following manner:

5.   (Twice amended)   A method of generating a tone waveform based on performance information, using a processor device executing a plurality of different programs on a time division basis, said method including executing a waveform calculating process for calculating tone waveform samples on the basis of one of the programs by sharing the processor device with another process based on another one of the programs, the waveform calculating process being executed per predetermined constant period so as to collectively generate a plurality of tone waveform samples per execution of the waveform calculating process, said method comprising the steps of:

detecting an amount of calculation time necessary for the other process, when the waveform calculating process is to be executed; and

calculating tone waveform samples by selectively executing the waveform calculating process that involves a variable calculation amount which depends on said amount of calculation time necessary for the other process detected by said step of detecting.

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12.   (Twice amended)   A machine-readable recording medium containing a group of instructions to cause said machine to generate a tone waveform based on performance information by executing a waveform calculating process for calculating tone waveform samples by using a processor device, the processor device also executing another process in response to a different group of instructions, the waveform calculating process being executed per predetermined constant period so as to collectively generate a plurality of tone waveform samples per execution of the waveform calculating process, said group of instructions executable by said processor device to perform a method comprising the steps of:

instructing the machine to detect an amount of calculation time necessary for the other process, when the waveform calculating process is to be executed;

instructing the machine to calculate tone waveform samples by selectively executing the waveform calculating process that involves a variable calculation amount that depends on said detected amount of calculation time necessary for the other process; and

instructing the machine to generate a tone waveform based on the calculated tone waveform samples.

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16.   (Twice amended)   A computer system for generating a tone waveform based on performance information, said computer system comprising:

a memory device that stores a plurality of programs; and

a processor device that executes a waveform generating process including a waveform calculating process for calculating tone waveform samples based on a predetermined one of said programs and one or more other processes based on other of said programs in a parallel manner on a time-division basis, the waveform calculating process being executed per predetermined constant period so as to collectively generate a plurality of tone waveform samples per execution of the waveform calculating process,

wherein said predetermined one of said programs includes the steps of:

detecting an amount of calculation time necessary for said other process, when the waveform calculating process is to be executed; and

calculating tone waveform samples by selectively executing the waveform calculating process that involves a variable calculation amount which depends on said amount of calculation time necessary for said other process detected by said step of detecting.

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26.   (Twice amended)   A tone waveform synthesizing apparatus comprising:

a storage adapted to temporarily store a plurality of tone waveform samples, said storage permitting the writing and reading, independently of each other, in a parallel fashion, said storage further storing a waveform forming program; and

a processor coupled to said storage and adapted to collectively generate a plurality of tone waveform samples in advance of predetermined reproduction timing, by executing the waveform forming program stored in said storage, said processor adapted to control writing of the generated tone waveform samples into said storage and reading out the tone waveform samples from said storage at said reproduction timing, the writing and reading into and from said storage being controlled independently of each other and also in such a manner that an advance of the writing does not outpace an advance of the reading.

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28.　(Amended)　A method of generating a tone waveform, said method comprising the steps of:

collectively generating a plurality of tone waveform samples in advance of predetermined reproduction timing, by a processor executing a waveform forming program;

writing, into a storage, the plurality of tone waveform samples produced by said generating step, said storage being capable of writing and reading, independently of each other, in a parallel fashion;

reading out the stored tone waveform samples from said storage at said reproduction timing; and

controlling writing and reading into and from said storage by said steps of writing and reading independently of each other and also in such manner that an advance of the writing does not outpace an advance of the reading.

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30.   (Amended)   A method of generating a tone waveform based on performance information, using a processor executing a tone waveform forming [process] program stored in a storage, said method comprising the steps of:

receiving automatic performance information;

receiving real-time performance information generated in response to a real-time performance operation;

generating tone waveform samples using said processor, said step of generating including a step of collectively generating a plurality of tone waveform samples in advance of predetermined reproduction timing on the basis of the received automatic performance information and a step of collectively generating a plurality of tone waveform samples in advance of predetermined reproduction timing on the basis of the received real-time performance information, said step of generating being capable of generating the tone waveform samples based on the automatic performance information and the tone waveform samples based on the real-time performance information in a parallel fashion; and

outputting the tone waveform samples generated by said step of generating.

31.   (Amended)   A method as recited in claim 30 wherein said step of outputting further includes a step of mixing the tone waveform samples based on the automatic performance information and the tone waveform samples based on the real-time performance information to thereby provide mixtures of the samples, each of the mixtures being composed of the tone waveform samples to be reproduced at a same reproduction timing, and a step of writing the mixtures into an output buffer.

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32.   (Amended)   A method as recited in claim 30 wherein said step of generating further comprises the step of performing arithmetic operations for generating the tone waveform samples based on the <u>automatic</u> performance information and the tone waveform samples based on the real-time performance information, independently of each other, in such a manner that an advance of the arithmetic operations for the tone waveform samples based on the <u>automatic</u> performance information and an advance of the arithmetic operations for the tone waveform samples based on the real-time performance information differ from each other.

33.   (Amended)   A method as recited in claim 32 wherein said step of generating further comprises the step of advancing arithmetic operations for the tone waveform samples based on the <u>automatic</u> performance information within an extent of an available processing capability taking into account a current processing capability of said processor.

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34.   (Amended)   A method of generating a tone waveform using a processor capable of executing a plurality of different programs on a time divisional basis, said method comprising the steps of:

supplying said processor with application software including at least an image control program for controlling image display, a music control program for controlling tone generation, and a general control program, said music control program including tone color data; [and]

causing said processor to execute, under control by the general control program, the image control program and the music control program in a parallel fashion, to output image data generated as a result of execution of the image control program and tone waveform data generated as a result of execution of the music control program;

detecting an available time portion in which said processor is not currently used for any other process than a tone waveform generating process, as an available processing capability for the tone waveform generating process; and

causing said processor to execute the tone waveform generating process based on the music control program, using the available processing capability detected by said step of detecting.

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41. A machine-readable medium for use in an apparatus having a processor, said medium including instructions executable by said processor for causing said apparatus to perform a method of generating a tone waveform, said method comprising the steps of:

collectively generating a plurality of tone waveform samples in advance of predetermined reproduction timing;

writing, into a storage, the plurality of tone waveform samples produced by said generating step, said storage being capable of writing and reading, independently of each other, in a parallel fashion;

reading out the stored tone waveform samples from said storage at said reproduction timing; and

controlling writing and reading into and from said storage by said steps of writing and reading independently of each other and also in such a manner that an advance of the writing does not outpace an advance of the reading.

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57.   (Amended)   A machine-readable medium for use in an apparatus having a processor, said medium including instructions executable by said processor for causing said apparatus to perform a method of generating a tone waveform based on performance information, said method comprising the steps of:

receiving <u>automatic</u> performance information;

receiving real-time performance information generated in response to a real-time performance operation;

generating tone waveform samples using said processor, said step of generating including a step of <u>collectively</u> generating a plurality of toe waveform samples in advance of predetermined reproduction timing on the basis of the received <u>automatic</u> performance information and a step of <u>collectively</u> generating a plurality of tone waveform samples in advance of predetermined reproduction timing on the basis of the received real-time performance information, said step of generating being capable of generating the tone waveform samples based on the <u>automatic</u> performance information and the tone waveform samples based on the real-time performance information in a parallel fashion; and

outputting the tone waveform samples generated by said step of generating.

58.   (Amended)   A medium as recited in claim 57 wherein said step of outputting further includes a step of mixing the tone waveform samples based on the <u>automatic</u> performance information and the tone waveform samples based on the real-time performance information to thereby provide mixtures of the samples, each of the mixtures being composed of the tone waveform samples to be reproduced at a same reproduction timing, and a step of writing the mixtures into an output buffer.

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61.   (Amended)   A machine-readable medium for use in an apparatus having a processor, said medium including instructions executable by said processor for causing said apparatus to perform a method of generating a tone waveform by executing a plurality of different programs on the time divisional basis, said method comprising the step of:

supplying said processor with application software including at least an image control program for controlling image display, a music control program for controlling tone generation, and a general control program, said music control program including tone color data; [and]

causing said processor to execute, under control by the general control program, the image control program and the music control program in a parallel fashion, to output image data generated as a result of execution of the image control program and tone waveform data generated as a result of execution of the music control program;

detecting an available time portion in which said processor is not currently used for any other process than a tone waveform generating process, as an available processing capability for the tone waveform generating process; and

causing said processor to execute the tone waveform generating process based on the music control program, using the available processing capability detected by said step of detecting.

68.   (Amended)   A tone waveform generating apparatus comprising:

storage adapted to receive <u>automatic</u> performance information and to receive real-time performance information generated in response to a real-time performance operation; and

a processor coupled to said storage and adapted to execute a tone waveform forming [process] <u>program stored in said storage</u>, said processor generating tone waveform samples by <u>collectively</u> generating a plurality of tone waveform samples in advance of predetermined reproduction timing on the basis of the <u>automatic</u> performance information and by <u>collectively</u> generating a plurality of tone waveform samples in advance of predetermined reproduction timing on the basis of the real-time performance information, said processor further generating the tone waveform samples based on the <u>automatic</u> performance information and the tone waveform samples based on the real-time performance information in a parallel fashion and outputting the generated tone waveform samples.

69.   (Amended)   An apparatus as recited in claim 68 wherein said processor further mixes the tone waveform samples based on the <u>automatic</u> performance information and the tone waveform samples based on the real-time performance information to thereby provide mixtures of the samples, each of the mixtures being composed of the tone waveform samples to be reproduced at a same reproduction timing, said processor further writing the mixtures into an output buffer.

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70. An apparatus as recited in claim 68 wherein said processor further performs arithmetic operations to generate the tone waveform samples based on the <u>automatic</u> performance information and the tone waveform samples based on the real-time performance information, independently of each other, in such a manner that an advance of the arithmetic operations for the tone waveform samples based on the <u>automatic</u> performance information and an advance of the arithmetic operations for the tone waveform samples based on the real-time performance information differ from each other.

71. (Amended) An apparatus as recited in claim 70 wherein said processor further advances arithmetic operations for the tone waveform samples based on the <u>automatic</u> performance information within an extent of an available processing capability taking into account a current processing capability of said processor.

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72.   (Amended)   A tone waveform generating apparatus comprising:

storage adapted to store application software including at least an image control program for controlling image display, a music control program for controlling tone generation, and a general control program, said music control program including tone color data; [and]

a processor coupled to said storage and adapted to generate a tone waveform by executing a plurality of different programs on a time divisional basis, said processor adapted to execute, under control by the general control program, the image control program and the music control program in a parallel fashion, to output image data generated as a result of execution of the image control program and tone waveform data generated as a result of execution of the music control program; and

detecting an available time portion in which said processor is not currently used for any other process than a tone waveform generating process, as an available processing capability for the tone waveform generating process; and

causing said processor to execute the tone waveform generating process based on the music control program, using the available processing capability detected by said step of detecting.

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